

Claims:

Amend all of the claims 1-28 as follows:

Claim 1 (currently amended): A multiuser ~~DSSS-OFDM~~ direct sequence spread spectrum (DSSS) orthogonal frequency division multiplexing (OFDM) multiband of UWB ultra wideband (UWB) base-station communication transmitter system comprising:

~~a multiuser encoding and spreading unit;~~
~~a polyphase-based multiband;~~
~~a IFFT unit;~~
~~a filtering unit; and~~
~~a multiband-based modulation and multicarrier.~~
N UWB mobile stations, where N is an integer;
an UWB basestation coupled to an UWB network
interface that is connected to an UWB network; and
said UWB basestation further including M
convolution encoders, M interleavers, M multipliers; M user
keys; a summation, a multiband splitter, M serial-to-
parallel (S/P) converters, M inverse fast Fourier transform
(IFFT), M guards, M filtering units, a multiband
multicarrier modulation, and a power amplifier (PA), where
M is an integer.

Claim 2 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM ~~multiband of UWB base-station communication transmitter system~~ of claim 1 wherein said multiuser
~~encoding and spreading unit includes an N-user bitstream, a~~
~~N-convolution encoder, a N-interleaver, a N-spread~~
~~multiplier, and a N-user key sequence.~~ each of the M user
keys is a unique pseudorandom (PN) sequence.

Claim 3 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base-station~~ communication
~~transmitter system~~ of claim 2 wherein said ~~N-user key~~
~~sequence is~~ M user keys are orthogonal each other.

Claim 4 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base-station~~ communication
~~transmitter system~~ of claim 3 wherein a cross-correlation
between one user key ~~sequence~~ and other user keys sequences
is almost equal to zero value.

Claim 5 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base-station~~ communication
~~transmitter system~~ of claim 1 wherein said ~~polyphase-based~~
multiband splitter further includes ten sample delay[[s]]
units, eleven down sample[[s]] units, eleven random access
memory (RAM) memories units, and one modular counter.

Claim 6 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base-station~~ communication
~~transmitter system~~ of claim 5 wherein said ~~polyphase-based~~
multiband splitter converts an N length of a serial
sequence into eleven multiband sequences with a length of
 $N/11[[]]$, where N is equal to $11P$ and P is an integer.

Claim 7 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base-station~~ communication
~~transmitter system~~ of claim 1 wherein said M IFFT ~~unit~~
~~includes~~ contain eleven IFFTs in parallel, each of the
IFFTs having 24 Nulls and 512 complex inputs to produce
1024 real-value outputs.

Claim 8 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 1 wherein said M filtering unit
sections includes eleven filtering ~~sections~~ systems, each
of the filtering ~~section~~ systems having a dual-switch, two
transmitter shaped filters, two digital-to-analog (D/A)
converters, two analog reconstruction filters, and one bit
detector.

Claim 9 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 8 wherein said dual-switch
contains two switches, one switch [[of]] rotating at even
number of input positions and another switch [[of]]
rotating at odd number of input positions sequentially.

Claim 10 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 8 wherein said bit detector is
used to ~~identifies~~ identify a ~~value of~~ the dual-switch
output values.

Claim 11 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 1 wherein said multiband-based
multicarrier modulation ~~and multicarrier~~ includes eleven
multiband quadrature phase-shift keying (QPSK) modulations,
which are controlled by eleven bit detectors, coupled to
one summation~~[[,]]~~ [[and]] followed by one analog bandpass
filter.

Claim 12 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 11 wherein said each of eleven
multiband QPSK modulations and multicarrier further
includes a multi-oscillator, two oscillator switches and
one QPSK switch both controlled by the bit detector, and
~~one up-carrier multiplier and one down-carrier multiplier.~~
an even-sequence-based mixer and an odd-sequence-based
mixer.

Claim 13 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 12 wherein said multi-
oscillator contains ~~four carriers of~~ positive and negative
carrier $\sin(2\pi f_i t)$ ~~[[,]]~~ and positive and negative carrier
 $\cos(2\pi f_i t)$.

Claim 14 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 12 wherein said one of the two
oscillator switches connects to either the positive $\cos(2\pi f_i t)$
or the negative $\cos(2\pi f_i t)$ ~~[[;]]~~ and said another of the two
oscillator switches connects to either the negative $\sin(2\pi f_i t)$
or the positive $\sin(2\pi f_i t)$ at the same time.

Claim 15 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB ~~base station~~ communication
~~transmitter system~~ of claim 12 wherein said QPSK switch
either connects to either the ~~up-carrier multiplier~~ even-

sequence-based mixer or connects to the down-carrier multiplier odd-sequence-based mixer.

Claim 16 (currently amended): A multiuser ~~DSSS-OFDM~~ direct sequence spread spectrum (DSSS) orthogonal frequency division multiplexing (OFDM) multiband of UWB ultra wideband (UWB) mobile communication receiver comprising:

~~a combination section of a multiband multicarrier down converter and demodulation, an A/D unit, and a digital receiver filter unit;~~

~~a FFT and FEQ section;~~

~~a polyphase-based demultiband; and~~

~~a despreading, deinterleaver and decoding section.~~

a low noise amplifier (LNA) coupled to an automatic gain control (AGC);

the AGC coupled to a multiband multicarrier down converter and demodulation;

the multiband multicarrier down converter and demodulation coupled to N analog-to-digital (A/D) converters, where N is an integer and greater than 1;

the N A/D converters coupled to 2N digital receiver filters;

the 2N digital receiver filters coupled to N time-domain equalizers (TEQ);

the N TEQ coupled to N serial-to-parallel (S/P);

the N S/P coupled to N guard removing;

the N guard removing coupled to N fast Fourier transform (FFT);

the N FFT coupled to N frequency-domain equalizers (FEQ);

the N FEQ coupled to N parallel-to-serial (P/S)
and the N A/D converters;

the N P/S coupled to a multiband combination;
the multiband combination coupled to a
dispreading, deinterleaving and decoding unit;

a channel estimator coupled to the N FEQ and the
N guard removing; and

a software and time control coupled to the AGC,
the multiband multicarrier down converter and demodulation,
the N A/D converters, and the channel estimator.

Claim 17 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB mobile communication receiver of
 claim 16 wherein said ~~combination section of a multiband~~
~~multicarrier down converter and demodulation, an A/D unit,~~
~~and a digital receiver filter unit includes an analog~~
~~bandpass filter, eleven multiband QPSK down converters and~~
~~demodulations, twenty-two A/D converters, and twenty-two~~
~~digital receiver filters.~~ multiband multicarrier down
converter and demodulation further includes P multiband
quadrature phase-shift keying (QPSK) down converters and
demodulations, where P is an integer and greater than 1.

Claim 18 (currently amended): The multiuser ~~DSSS-OFDM~~
DSSS OFDM multiband of UWB mobile communication receiver of
 claim ~~[[16]]~~ 17 wherein said each of the ~~[[N]]~~ P multiband
 QPSK down converters and demodulations further include ~~an~~
~~up-level carrier multiplier of a mixer of a carrier~~ $\cos(2\pi f_i t)$
 coupled to an anti-aliasing analog filter and ~~a down-level~~
~~carrier multiplier of a mixer of a carrier~~ $\sin(2\pi f_i t)$ coupled

to an anti-aliasing analog filter, where f_i is the carrier frequency for i th multiband and i is an integer.

Claim 19 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of claim ~~[[16]]~~ 18 wherein said ~~FFT and FEQ section includes eleven FFT units and eleven FEQ units.~~ i th multiband can be turn on or off, where i is an integer.

Claim 20 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of claim ~~[[19]]~~ 16 wherein said each of the N FFT unit has 1024 real-value inputs and produces 500 complex outputs ~~in the frequency domain~~ and 12 Nulls, where N is an integer.

Claim 21 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of claim ~~[[19]]~~ 16 wherein said each of the N FEQ unit includes ~~[[500]]~~ M equalizers, ~~[[500]]~~ M decision detectors, ~~[[500]]~~ M subtracts, and an adaptive algorithm, where M is an integer.

Claim 22 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of claim 21 wherein said each of the M equalizers is a linear equalizer with N -tap adjustable coefficients, where M and N are integers.

Claim 23 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of

claim 21 wherein said each of the M decision detectors is a multi-level threshold.

Claim 24 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of claim 16 wherein said ~~polyphase-based~~ [[de]]multiband combination includes a modular counter, eleven random access memory (RAM) memories units, eleven up sample~~[[s]]~~ units, ten sample delay~~[[s]]~~ units, and a addition.

Claim 25 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of claim 24 wherein said ~~polyphase-based~~ [[de]]multiband combination converts eleven multiband input sequences with a length of [[N/11]] L into a serial output sequence with a length of N, where N is equal to 11L and L is an integer.

Claim 26 (currently amended): The multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication receiver of claim 16 wherein said despreading, ~~deinterleaver~~ deinterleaving and decoding ~~section~~ unit further includes a despreading multiplier, a user key, ~~sequence~~, a deinterleaver, a ~~Viterbi~~ decoding, and a user bitstream.

Claim 27 (currently amended): A multiuser ~~DSSS-OFDM~~ multiband of ~~UWB~~ ultra wideband (UWB) communication system comprises a multiuser ~~DSSS-OFDM~~ direct sequence spread spectrum (DSSS) orthogonal frequency division multiplexing (OFDM) multiband of UWB base station communication transmitter and receiver, and N different users of [[the]]

~~DSSS-OFDM~~ DSSS OFDM multiband of UWB mobile communication transmitters and receivers[[]], where N is an integer.

Claim 28 (currently amended): The multiuser ~~DSSS-OFDM~~ multiband of UWB communication system of claim 27 wherein said multiuser ~~DSSS-OFDM~~ DSSS OFDM multiband of UWB base station communication transmitter and receiver can transmit and receive N different user[[]] UWB signals simultaneously, where N is an integer.